




Further marketing of Central Valley Project water from Folsom Dam threatens downstream steelhead fishing.

Sacramento River System

The Setting



The Sacramento River, its main tributaries—the Feather and American rivers—and 20 smaller tributaries, produce most of the salmon and a large percentage of the steelhead harvested in California. Water storage and diversion practices throughout the basin are steadily destroying the river habitat. Available spawning habitat has been reduced from 6,000 miles of river to just 300 miles! In order to maintain fish production numbers, there has been increasing dependency on the area's four state and federal salmon and steelhead hatcheries, a dependency that is dangerous.

The Problems

Thirty years ago, the Sacramento River basin supported four healthy and distinct spawning runs of king salmon, occurring in the fall, late fall, winter and spring. Since then, the late fall run has been eliminated. Spring-run salmon, once the dominant race throughout the Central Valley, survive only in scattered remnants. Winter-run numbers are so low these fish have been nominated for federal protection under the Endangered Species Act.

Only the fall-run king salmon of the Sacramento River basin has been maintained. Its survival is attributed both to its tolerance of warmer, low elevation stream habitats and to expensive state and federal hatchery programs.

Steelhead runs in the upper Sacramento

River averaged about 20,000 fish in the 1950's. By 1983, the count had fallen below 2,000 fish. Maintenance of steelhead populations now also depends on hatchery production — from Coleman, Feather River and Nimbus hatcheries.

Somehow, despite this bleak picture, the Sacramento River system still produces 70% of the salmon caught in California waters — about a half million fish. With more thoughtful water project operations, the elimination of fish-killing factors like unscreened irrigation diversions, optimization of remnant stream habitat and modernization of aging hatcheries, the harvest could be twice what it is today. This doubling would provide a statewide economic benefit of \$150 million annually.

Fish-killing factors

When the federal Central Valley Projects Shasta and Keswick dams were completed in the early 1940's, they blocked the migration of salmon and steelhead spawners that had already traveled some 300 miles upstream from the Golden Gate. Even so, throughout the 1950's, the Sacramento River stream bed at Redding, just below the dams, was black with spawning salmon and steelhead.

This prolific spawning activity came to an abrupt halt in 1964, with completion of the Central Valley Project's Red Bluff diversion dam, located 40 miles below Redding. The fish ladders over this diversion dam do not work under most river flow conditions. Each year, spawners struggle, in vain, to reach the spawning grounds above the diversion dam. Eventually, they are forced to spawn in the poor habitat below this dam or perish during their futile efforts to pass it.

The Red Bluff diversion dam has destroyed over half the upper Sacramento River king salmon spawning run in the past 20 years

Irrigation customers pay a cheap price for water. The cost to the salmon and steelhead resources has been excessive. The loss to the fisheries is estimated to be 228,000 salmon, equal to half of the present \$100 million statewide harvest. There is no reasonable explanation for the U.S. Bureau of Reclamation's failure to replace the Red Bluff diversion dam fish ladders.

The inexcusable waste of the fisheries resource continues sixty miles downstream. The Glenn-Colusa Irrigation District (GCID) draws off one-fifth (20%) of the Sacramento River flow with its pumps — and kills at least one-fifth of the river's juvenile salmon and unknown numbers of steelhead in the process. Estimates of juvenile salmon killed at the dysfunctional fish screen in front of the pumps range from five million to twenty million fish a year. Even the lower estimate translates to an average annual harvest loss of 35,000 adult fish.

It is sad to note that the GCID's dysfunctional fish screens *kill* more salmon than are produced at the Coleman National Fish Hatchery, 100 miles upstream. Coleman hatchery production was intended to compensate for the loss of habitat due to the construction of Shasta and Keswick dams. Between them, the federal government's dysfunctional fish ladders at Red Bluff and the GCID's dysfunctional fish screen deprive Californians of *300,000 harvestable king salmon*.

Clearly, the disasters at Red Bluff and GCID must be resolved. This compounding

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"Seventy-five percent of California's present instream salmon production and half of the state's remaining steelhead are now at risk because of inadequate stream flow provisions in the Sacramento-San Joaquin rivers Delta and the Trinity River..."

of losses to water storage and water diversions accounts for tremendous annual losses and the continued decline of naturally spawning salmon and steelhead in the Sacramento River Basin.

A troubled future for watershed's salmon and steelhead

There is no doubt that water development projects have caused the severe decline of salmon and steelhead trout in this river basin since World War II. Further exploitation of the area's stream resources, particularly by the federal Central Valley Project, threatens to destroy the natural spawning populations of both species altogether.

The large Shasta and Folsom storage reservoirs, and the state's reservoir at Oroville, trap the early spring flows that juvenile fish need for their downstream migration to the sea. The stored water is delivered in the summer to the projects' irrigation customers. The pools that remain behind the dams in October, when spawning begins, retain summer heat.

As the U.S. Bureau of Reclamation continues to promote the sale of water from its reservoirs — it claims to have an annual average 1.1 million acre-feet not yet sold — the draw-down and warming problem for salmon and steelhead becomes more severe. Even in poor rainfall years, like 1987 and 1988, the Bureau's irrigation customers are guaranteed all the water they want, while fish protection flows are cut to "dry year" minimums as early

as April. The fall 1987 stream temperatures in the upper Sacramento and American rivers below the federal Central Valley Project reservoirs were lethal for salmon and their spawn.

Controlling spring flows by holding them in federal reservoirs has had an additional impact on fish life. The reduction of flood dangers along the river has made it possible for adjacent landowners to crowd their homes and orchards to the river's edge. These landowners have recently revived a U.S. Army Corps of Engineers plan to blanket the streambanks between Red Bluff and Chico with rock rip-rap to prevent bank erosion.

The construction of Shasta Dam blocked the natural movement of river gravels, so most of the replacement spawning gravel now comes from the erosion of banks downstream. The rip-rapping would starve the river of essential gravel and contribute further to the decline of the Sacramento River's natural spawning populations.

Whether hatchery or natural stock, salmon and steelhead have much to overcome on the downstream migration. If they reach Sacramento, they still must pass through the Delta to reach the sea. The rate at which they survive this passage depends upon the amount of stream flow that is available to sweep them past the state and federal project pumping plants to the safety of San Francisco Bay.

State and federal fishery scientists testified at the 1987 state Bay-Delta water rights hearings that the amount of stream flow allocated